



[Global Biogeochemical Cycles]

Supporting Information for

**Controls on Dissolved Silicon Isotopes along the US GEOTRACES Eastern Pacific
Zonal Transect (GP16)**

[P. Grasse^{1,2}, I. Closset³, J. L. Jones³, S. Geilert², and M.A. Brzezinski³]

¹German Centre for integrative Biodiversity Research (iDiv)
Deutscher Platz 5E, 04103 Leipzig
Germany

²GEOMAR Helmholtz Centre for Ocean Research Kiel
Ocean Circulation and Climate Dynamics
Wischhofstr. 1-3
24148 Kiel,
Germany

³Marine Science Institute and the Department of Ecology, Evolution, and Marine
Biology
University of California,
Santa Barbara, CA 93106
USA

Contents of this file

Figures S1 to S6
Tables S1 to S3

Additional Supporting Information

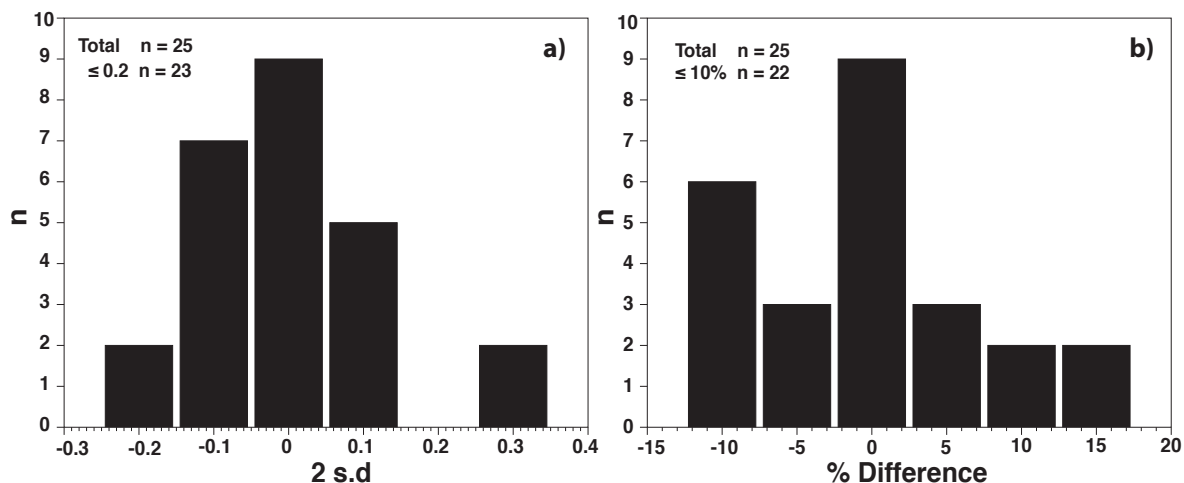


Figure S1. (a) Number of samples (n) with their respective external reproducibility (2 s.d.) and (b) % difference between $\delta^{30}\text{Si}$ measurements from GEOMAR and UCSB. See also Table S2 and S3.

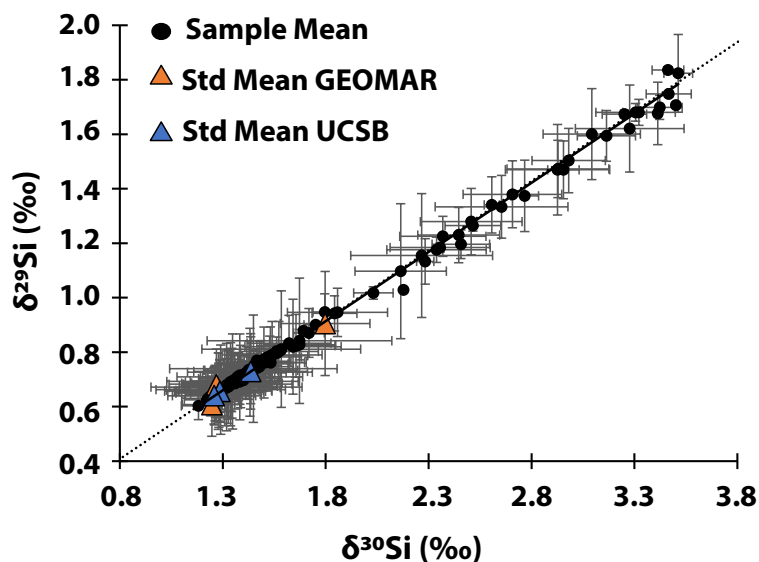


Figure S2. $\delta^{30}\text{Si}$ vs $\delta^{29}\text{Si}$ of sample means (black dots), means of reference materials analyzed at GEOMAR (orange triangles) and the means of reference materials analyzed at UCSB (blue triangles). Error bars represent the average standard deviation (± 0.2 ‰). The black line is the least square linear regression between $\delta^{30}\text{Si}$ and $\delta^{29}\text{Si}$ of the sample datasets ($\delta^{30}\text{Si} = 0.5078 \times \delta^{29}\text{Si}$, $R^2 = 0.9972$), and the dotted line represents the theoretical kinetic fractionation law ($\delta^{30}\text{Si} = 0.5092 \times \delta^{29}\text{Si}$, as calculated following Young et al. (2002)). Note that, for clarity, Big Batch values are not shown on the plot but fall on the same fractionation line (see Table. S3).

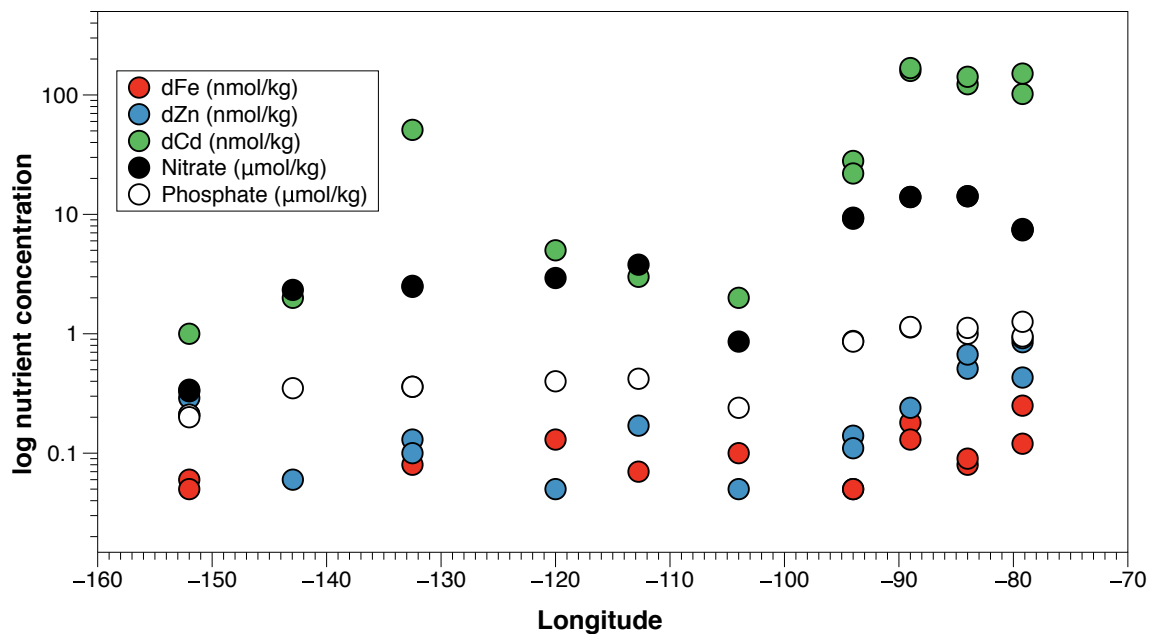


Figure S3. Concentrations of macronutrients ($[\text{PO}_4^{3-}]$, $[\text{NO}_3^-]$) as well as micronutrients (dissolved iron (dFe), zinc (dZn), cadmium(dCd)) in the upper 50 m across the transect. Please note the logarithmic scale for nutrient concentrations as well as different units: $[\text{PO}_4^{3-}]$, $[\text{NO}_3^-]$ concentrations are in $\mu\text{mol kg}^{-1}$ and dFe, dZn, dCd in nmol kg^{-1} . Trace metal data is adapted from John et al. (2017; 2018).

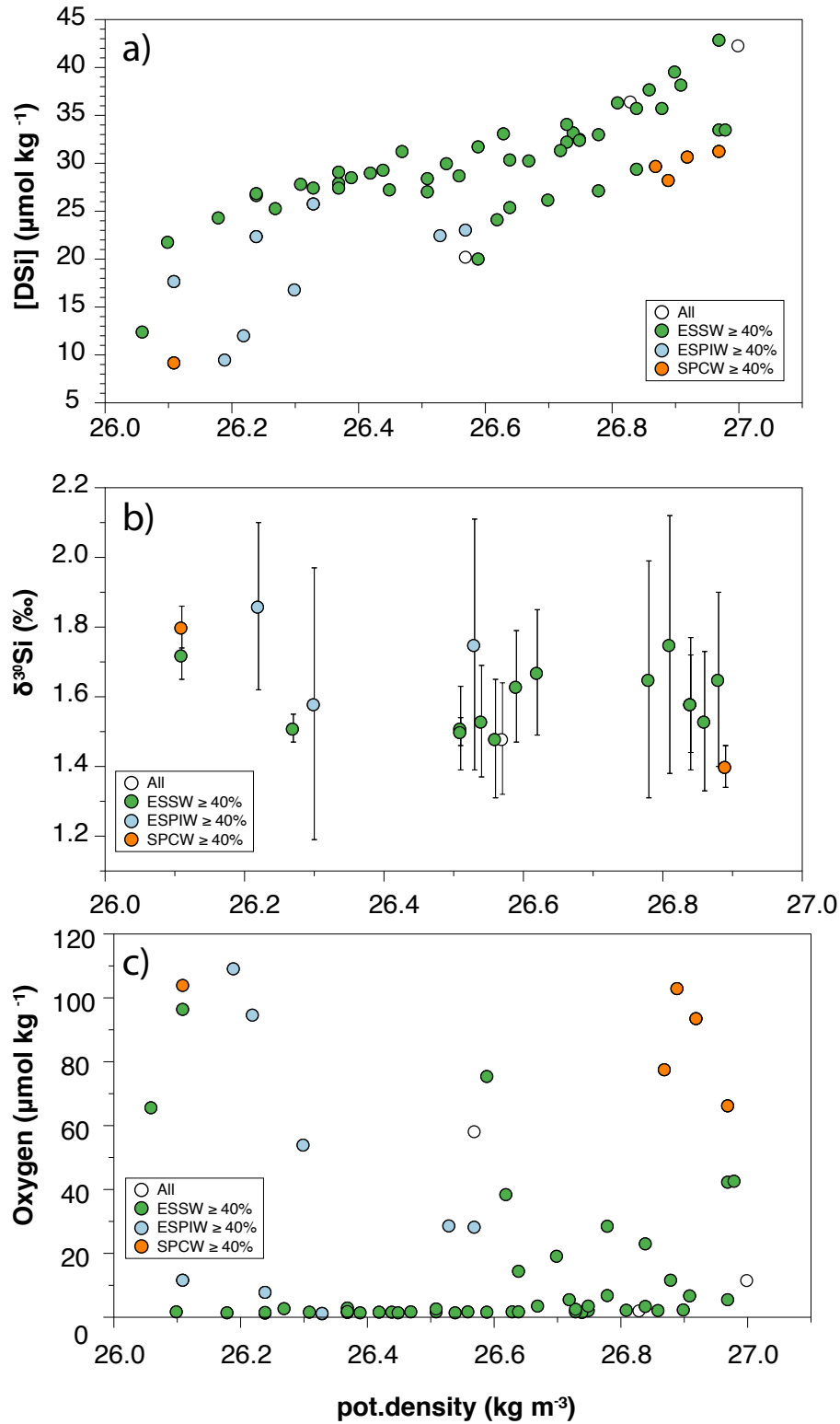


Figure S4. (a) Distribution of [DSi], (b) $\delta^{30}\text{Si}$ and (c) oxygen concentrations in subsurface waters (potential density: 26 to 27 kg/m³). Samples with ESSW, ESPIW and SPCW water mass contribution over 40% are marked in green, blue and orange, respectively.

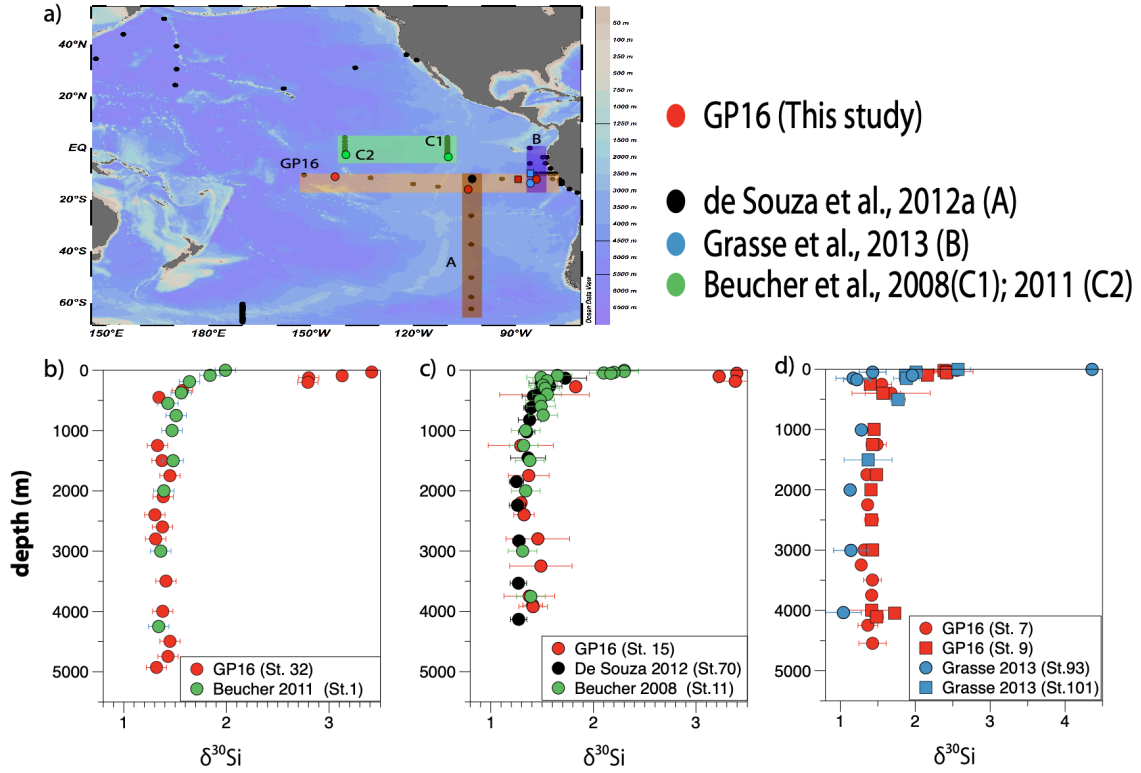


Figure S5. (a) Map showing sampling locations for $\delta^{30}\text{Si}$ in the Pacific with four highlighted transects in the Eastern Pacific. The GP 16 transect is marked in red. The data by de Souza et al. (2012a; A) in grey. Data from offshore transects by Grasse et al. (2013, B) in blue and Beucher et al. (2008, C1) and Beucher et al. (2011, C2) in green. (b) Comparison between Beucher et al. (2011, St. 1) and GP16 (St. 32) (c). Comparison between data from de Souza et al. (2012a, St. 70), GP 16 (Sts. 15) and Beucher et al. (2008, St. 11) (d) Comparison between data from Grasse et al. (2013; Sts. 93, 101) and GP16 (Sts. 7, 9). Individual error bars indicate the reproducibility of analytical replicates (2 s.d.) as given in the references. Please note the different scale for (d).

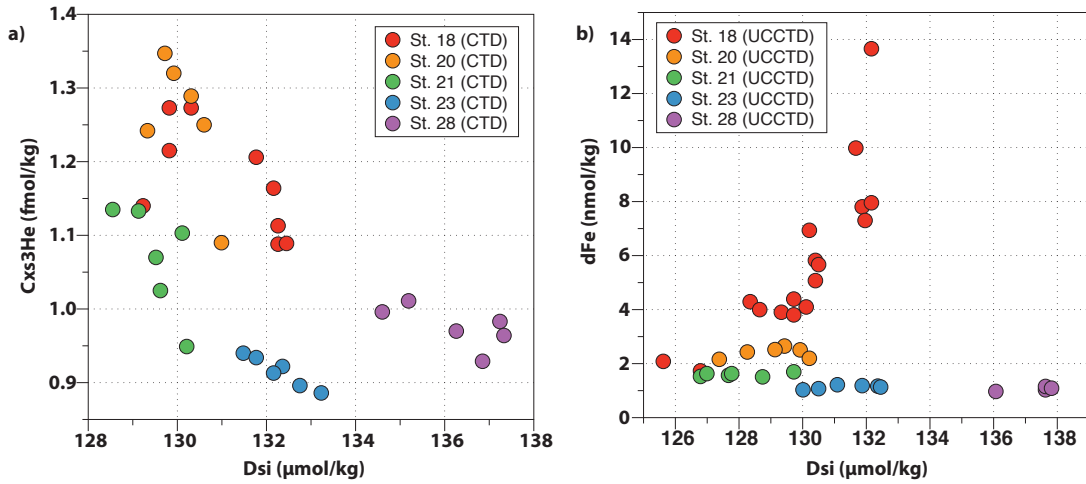


Figure S6: (a) Excess ^3He ($C_{\text{ex}}^3\text{He}$) in fmol kg^{-1} (data adapted from Jenkins et al., 2018) versus DSi (in $\mu\text{mol kg}^{-1}$), (b) DSi ($\mu\text{mol kg}^{-1}$) versus dFe (nmol kg^{-1}) above and westward of the EPR (Sts. 18, 20, 23, 28). Samples during GP16 were taken with a conventional CTD (CTD; Helium samples) and with an ultra-clean CTD (UCCTD, dFe samples). $[\text{DSi}]$ measured in CTD and UCCTD samples showed small differences ($< 5\%$). Therefore, we plotted Helium versus $[\text{DSi}]$ from CTD samples and $[\text{dFe}]$ versus DSi from UCCTD samples.

Table S1. Sampling locations with $\delta^{30}\text{Si}$ measurements and nutrient concentrations ($[\text{Si}]$, $[\text{NO}_3^-]$, $[\text{PO}_4^-]$) as well as hydrography data. The external reproducibility (2 s.d.) for n analytical replicates is given. In case samples were measured at both laboratories (GEOMAR and UCSB) 2 s.d represents the external reproducibility of all single measurements. Further details on the inter-calibration between both laboratories are in the supplementary (Tabs. S1, S2). $\delta^{30}\text{Si}$ data is available through the Biological and Chemical Oceanography Data Management Office Website (<https://www.bco-dmo.org/dataset/728819>).

Station	GEOTRACES SAMPLE Nr.	Lat	Long	Bottom Depth (m)	DEPTH (m)	Temp (°C)	Salinity	Pot. Density (kg/m ³)	Oxygen (μmol/kg)	DSi (μmol/kg)	Nitrate (μmol/kg)	Phosphate (μmol/kg)	Dsi/N (μmol/kg)	$\delta^{30}\text{Si}$ (‰)	2 s.d.	n	Lab	ln (Dsi)	Si*
1	2143	-12.01	-79.20	5526	19.7	17.63	35.19	25.51	241.7	2.54	7.43	0.92	0.34	2.95	0.08	2	GEOMAR	0.93	-4.89
1	2142	-12.01	-79.20	5526	28.6	17.61	35.19	25.52	239.9	2.44	7.54	0.95	0.32	2.93	0.25	3	GEOMAR	0.89	-5.1
1	2140	-12.01	-79.20	5526	64.3	16.60	35.12	25.70	187.9	5.46	11.38	1.52	0.48	2.28	0.04	3	GEOMAR	1.70	-5.92
1	2138	-12.01	-79.20	5526	130.2	13.38	34.94	26.27	3	25.37	22.22	2.43	1.14	1.51	0.04	2/1	GEOMAR/UCSB	3.23	3.15
1	2134	-12.01	-79.20	5526	261.1	11.82	34.85	26.51	2	28.5	27.93	2.54	1.02	1.51	0.12	2	GEOMAR	3.35	0.57
1	2081	-12.01	-79.20	5525	449.9	8.97	34.66	26.86	2.4	37.77	37.88	2.88	1.00	1.53	0.20	3/3	GEOMAR/UCSB	3.63	-0.11
1	2078	-12.01	-79.20	5525	799.6	5.51	34.54	27.25	24.4	69.02	45.52	3.24	1.52	1.51	~	1	UCSB	4.23	23.5
1	2076	-12.01	-79.20	5525	1201.5	3.82	34.57	27.46	64.9	102.11	42.5	3.1	2.40	1.36	0.18	2/2	GEOMAR/UCSB	4.63	59.61
1	2074	-12.01	-79.20	5525	2002.4	2.29	34.64	27.66	101.1	142.9	39.31	2.89	3.64	1.31	0.27	3	UCSB	4.96	103.59
1	2073	-12.01	-79.20	5525	2400.9	1.95	34.66	27.71	121.9	143.58	37.7	2.75	3.81	1.30	0.11	5	UCSB	4.97	105.88
1	2072	-12.01	-79.20	5525	2800.7	1.80	34.68	27.73	129.2	148.56	37.3	2.71	3.98	1.43	0.09	4	UCSB	5.00	111.26
1	2071	-12.01	-79.20	5525	3198.1	1.80	34.68	27.73	130.8	150.61	37.2	2.7	4.05	1.31	0.08	7	UCSB	5.01	113.41
1	2251	-12.01	-79.20	5527	3194.8	1.79	34.68	27.73	131.1	149.83	37.32	2.7	4.01	1.31	~	1	UCSB	5.01	112.51
1	2250	-12.01	-79.20	5527	3594.9	1.80	34.68	27.73	134.4	148.75	36.99	2.68	4.02	1.34	0.10	3	UCSB	5.00	111.76
1	2248	-12.01	-79.20	5527	4393.5	1.79	34.69	27.74	152.2	135.28	35.56	2.58	3.80	1.35	0.11	2	UCSB	4.91	99.72
1	2245	-12.01	-79.20	5527	5040.8	1.83	34.69	27.74	157.1	132.65	34.89	2.57	3.80	1.35	0.13	4	UCSB	4.89	97.76
1	2243	-12.01	-79.20	5527	5317	1.85	34.69	27.74	159.5	131.48	34.86	2.58	3.77	1.30	~	1	UCSB	4.88	96.62
1	2240	-12.01	-79.20	5527	5500.3	1.88	34.69	27.73	158.3	131.48	34.68	2.57	3.79	1.29	0.18	4	UCSB	4.88	96.8
7	3175	-12.00	-84.00	4553	19.5	18.95	35.29	25.26	235.1	4.68	14.19	1	0.33	2.46	0.14	2	GEOMAR	1.54	-9.51
7	3174	-12.00	-84.00	4553	39.5	18.45	35.29	25.38	228.5	4.78	14.18	1.12	0.34	2.34	0.24	3	GEOMAR	1.56	-9.4
7	3173	-12.00	-84.00	4553	58.9	17.82	35.28	25.53	220.6	5.56	14.82	1.4	0.38	2.37	0.21	3	GEOMAR	1.72	-9.26
7	3167	-12.00	-84.00	4553	251	11.56	34.83	26.54	1.7	30.06	23.82	2.58	1.26	1.53	0.16	2/2	GEOMAR/UCSB	3.40	6.24
7	3155	-12.00	-84.00	4546	399.1	9.39	34.69	26.81	2.5	36.41	36.53	2.8	1.00	1.75	0.37	2/4	GEOMAR/UCSB	3.59	-0.12
7	3149	-12.00	-84.00	4546	1249.4	3.58	34.57	27.49	70.2	107.08	42.52	3.11	2.52	1.42	0.27	2/5	GEOMAR/UCSB	4.67	64.56
7	3147	-12.00	-84.00	4546	1749.1	2.51	34.63	27.63	95.9	135.58	40.24	2.99	3.37	1.37	~	1	UCSB	4.91	95.34
7	3145	-12.00	-84.00	4546	2249.2	2.05	34.66	27.69	113.6	146.31	38.79	2.86	3.77	1.43	0.21	2	UCSB	4.99	107.52
7	3264	-12.00	-84.00	4561	2996	1.80	34.68	27.73	131.7	149.92	37.23	2.72	4.03	1.27	0.13	2	UCSB	5.01	112.69
7	3263	-12.00	-84.00	4561	3244.4	1.79	34.68	27.73	136.9	147.09	36.79	2.69	4.00	1.18	0.08	3	UCSB	4.99	110.3
7	3262	-12.00	-84.00	4561	3494.3	1.78	34.69	27.74	144.7	140.55	36.13	2.64	3.89	1.38	0.17	4	UCSB	4.95	104.42
7	3260	-12.00	-84.00	4561	3746.1	1.77	34.69	27.74	148.3	137.72	35.89	2.62	3.84	1.39	0.19	3	UCSB	4.93	101.83
7	3258	-12.00	-84.00	4561	4243.3	1.80	34.69	27.74	150.4	136.55	35.71	2.6	3.82	1.38	0.12	2	UCSB	4.92	100.84
7	3255	-12.00	-84.00	4561	4543.2	1.84	34.69	27.74	150.2	136.65	35.64	2.6	3.83	1.28	0.21	4	UCSB	4.92	101.01
9	3403	-12.00	-89.00	4137	20.6	19.07	35.36	25.28	234.1	5.37	14	1.13	0.38	2.31	0.31	2/1	GEOMAR/UCSB	1.68	-8.63
9	3402	-12.00	-89.00	4137	39.8	19.03	35.36	25.29	233.5	5.37	13.94	1.14	0.39	2.52	0.14	2	GEOMAR	1.68	-8.57
9	3401	-12.00	-89.00	4137	59.4	18.17	35.31	25.47	228	4.59	12.46	1.2	0.37	2.36	0.24	2	GEOMAR	1.52	-7.87
9	3400	-12.00	-89.00	4137	99.4	16.08	35.06	25.77	124.5	8.1	18.92	1.7	0.43	2.03	0.10	3	GEOMAR	2.09	-10.82
9	3394	-12.00	-89.00	4137	248.1	11.41	34.82	26.56	2	28.79	28.76	2.56	1.00	1.48	0.17	2/3	GEOMAR/UCSB	3.36	0.03
9	3346	-12.00	-89.00	4130	397.7	9.12	34.67	26.84	3.7	35.82	37.76	2.82	0.95	1.58	0.19	1/3	GEOMAR/UCSB	3.58	-1.94
9	3341	-12.00	-89.00	4130	993.5	4.45	34.54	27.37	56.7	83.27	43.35	3.13	1.92	1.51	~	1	UCSB	4.42	39.92
9	3340	-12.00	-89.00	4130	1243.1	3.56	34.57	27.49	75.3	103.86	41.86	3.07	2.48	1.47	0.14	2/3	GEOMAR/UCSB	4.64	62
9	3338	-12.00	-89.00	4130	1740.5	2.54	34.63	27.63	99.2	130.21	39.71	2.96	3.28	1.36	0.22	3	UCSB	4.87	90.5
9	3337	-12.00	-89.00	4130	1989.3	2.27	34.64	27.66	106.2	138.8	39.03	2.91	3.56	1.35	~	1	UCSB	4.93	99.77
9	3453	-12.00	-89.00	4138	2485.1	1.88	34.67	27.72	127.5	143.78	37.62	2.76	3.82	1.38	0.19	3	UCSB	4.97	106.16
9	3451	-12.00	-89.00	4138	2981.5	1.78	34.68	27.73	140.3	140.65	36.67	2.67	3.84	1.28	0.26	4	UCSB	4.95	103.98
9	3447	-12.00	-89.00	4138	3975	1.81	34.69	27.74	144.7	138.11	36.3	2.63	3.80	1.23	~	1	UCSB	4.93	101.81
9	3443	-12.00	-89.00	4138	4085	1.83	34.69	27.73	145	138.11	36.29	2.63	3.81	1.45	0.01	2	UCSB	4.93	101.82

Table S1. Continued

Station	GEOTRACES SAMPLE Nr.	Lat	Long	Bottom Depth (m)	DEPTH (m)	Temp (°C)	Salinity	Pot. Density (kg/m3)	Oxygen (μmol/kg)	DSi (μmol/kg)	Nitrate (μmol/kg)	Phosphate (μmol/kg)	Dsi/N (μmol/kg)	δ ³⁰ Si (‰)	2 s.d.	n	Lab	ln (Dsi)	Si*
11	3578	-12.00	-94.00	3660	39.8	20.96	35.48	24.87	225.6	3.32	9.19	0.86	0.36	2.65	0.32	2	GEOMAR	1.20	-5.87
11	3576	-12.00	-94.00	3660	110.9	16.90	35.14	25.65	161	3.61	11.62	1.13	0.31	2.16	0.22	2	GEOMAR	1.28	-8.01
11	3575	-12.00	-94.00	3660	130.1	15.41	34.96	25.85	123.1	6.44	16.62	1.5	0.39	1.84	0.11	2	GEOMAR	1.86	-10.18
11	3569	-12.00	-94.00	3660	259.4	11.45	34.76	26.51	2.9	27.13	26.54	2.65	1.02	1.50	0.04	1/1	GEOMAR/UCSB	3.30	0.59
11	3529	-12.00	-94.00	3660	399.9	8.76	34.65	26.88	11.9	35.82	38.58	2.76	0.93	1.65	0.25	1/2	GEOMAR/UCSB	3.58	-2.76
11	3526	-12.00	-94.00	3660	699.3	5.82	34.53	27.20	35.7	58.18	44.06	3.08	1.32	1.35	0.07	2	UCSB	4.06	14.12
11	3524	-12.00	-94.00	3660	899.3	4.73	34.53	27.33	57.2	75.75	43.23	3.08	1.75	1.39	0.11	2	UCSB	4.33	32.52
11	3522	-12.00	-94.00	3660	1249.4	3.51	34.57	27.49	79.9	104.84	41.39	3.05	2.53	1.43	0.09	2/1	GEOMAR/UCSB	4.65	63.45
11	3520	-12.00	-94.00	3660	1751.1	2.56	34.62	27.62	105.1	128.36	39.31	2.92	3.27	1.37	~	1	UCSB	4.85	89.05
11	3698	-12.00	-94.00	3664	2247.3	1.99	34.66	27.70	125.3	141.43	37.66	2.74	3.76	1.30	~	1	UCSB	4.95	103.77
11	3697	-12.00	-94.00	3664	2497.1	1.83	34.67	27.72	142.7	136.75	36.29	2.63	3.77	1.33	0.04	2	UCSB	4.92	100.46
11	3696	-12.00	-94.00	3664	2747.1	1.78	34.68	27.73	145.9	138.6	36.15	2.62	3.83	1.24	0.14	2	UCSB	4.93	102.45
11	3695	-12.00	-94.00	3664	2996.2	1.78	34.68	27.73	144	141.73	36.35	2.64	3.90	1.29	0.08	2	UCSB	4.95	105.38
11	3692	-12.00	-94.00	3664	3495.8	1.80	34.69	27.74	142.5	142.21	36.44	2.64	3.90	1.29	0.20	2	UCSB	4.96	105.77
11	3690	-12.00	-94.00	3664	3620.5	1.81	34.69	27.74	142.2	142.41	36.41	2.64	3.91	1.28	0.14	5	UCSB	4.96	106
11	3689	-12.00	-94.00	3664	3639.3	1.81	34.69	27.74	142.2	142.7	36.49	2.64	3.91	1.69	~	1	UCSB	4.96	106.21
15	8163	-16.00	-104.00	3937	50.4	22.33	35.96	24.85	218.8	1.17	0.84	0.25	1.39	3.41	0.02	2	GEOMAR	0.16	0.33
15	8161	-16.00	-104.00	3937	104.6	21.76	35.99	25.04	216.9	1.37	0.96	0.29	1.43	3.31	0.19	2	GEOMAR	0.31	0.41
15	8159	-16.00	-104.00	3937	183.9	18.40	35.37	25.46	192.7	1.46	4.93	0.54	0.30	2.98	0.18	3	GEOMAR	0.38	-3.47
15	8157	-16.00	-104.00	3937	275.2	12.20	34.58	26.22	94.9	12.1	20.04	1.8	0.60	1.86	0.24	4	GEOMAR	2.49	-7.94
15	8154	-16.00	-104.00	3937	408.8	8.73	34.58	26.84	23.3	29.48	36.85	2.66	0.80	1.58	0.14	3/1	GEOMAR/UCSB	3.38	-7.37
15	3961	-16.00	-104.00	3933	1249.6	3.57	34.56	27.48	82.4	98.49	41.26	3	2.39	1.39	0.14	2/2	GEOMAR/UCSB	4.59	57.23
15	3959	-16.00	-104.00	3933	1747.5	2.57	34.62	27.62	108.5	122.89	39.05	2.86	3.15	1.38	0.16	4	UCSB	4.81	83.84
15	3957	-16.00	-104.00	3933	2198.9	2.04	34.65	27.69	135.3	130.11	36.94	2.7	3.52	1.28	0.20	4	UCSB	4.87	93.17
15	3955	-16.00	-104.00	3933	2398.3	1.90	34.67	27.71	144.3	132.06	36.21	2.65	3.65	1.32	0.03	2	UCSB	4.88	95.85
15	8211	-16.00	-104.00	3938	2795.4	1.82	34.68	27.73	145.3	137.14	36.14	2.62	3.79	1.29	0.22	2	UCSB	4.92	101
15	8209	-16.00	-104.00	3938	3246.6	1.81	34.68	27.73	141.4	144.36	36.6	2.65	3.94	1.35	0.32	4	UCSB	4.97	107.76
15	8207	-16.00	-104.00	3938	3744.8	1.83	34.68	27.73	137.6	149.63	37.02	2.68	4.04	1.33	0.23	4	UCSB	5.01	112.61
15	8204	-16.00	-104.00	3938	3894.8	1.84	34.68	27.73	137.2	150.22	36.98	2.68	4.06	1.32	0.19	2	UCSB	5.01	113.24
15	8203	-16.00	-104.00	3938	3919.4	1.85	34.68	27.73	137.6	150.9	36.99	2.69	4.08	1.29	0.31	3	UCSB	5.02	113.91
18	8453	-14.98	-112.75	2644	19.7	24.31	35.84	24.19	212.1	1.56	3.79	0.42	0.41	3.09	0.24	2	GEOMAR	0.44	-2.23
18	8451	-14.98	-112.75	2644	95.4	22.49	36.18	24.98	209.8	1.17	0.29	0.3	4.03	3.51	0.07	2	GEOMAR	0.16	0.88
18	8449	-14.98	-112.75	2644	201.8	18.86	35.53	25.46	193.9	1.07	3.73	0.43	0.29	3.16	0.14	2	GEOMAR	0.07	-2.66
18	8448	-14.98	-112.75	2644	303.4	12.00	34.62	26.30	54.2	16.89	23.07	2.19	0.73	1.58	0.39	3/1	GEOMAR/UCSB	2.83	-6.18
18	8446	-14.98	-112.75	2644	396.7	9.16	34.61	26.78	28.8	27.23	34.63	2.55	0.79	1.65	0.34	2/1	GEOMAR/UCSB	3.30	-7.4
18	8444	-14.98	-112.75	2644	795.4	5.23	34.50	27.25	76.5	58.86	40.81	2.8	1.44	1.69	0.29	1/4	GEOMAR/UCSB	4.08	18.05
18	8510	-14.98	-112.75	2643	1193.5	3.61	34.56	27.47	86.1	96.15	40.83	2.88	2.35	1.38	0.13	2/3	GEOMAR/UCSB	4.57	55.32
18	8505	-14.98	-112.75	2643	2186.1	1.95	34.66	27.70	141.1	129.14	36.47	2.6	3.54	1.23	~	1	UCSB	4.86	92.67
18	8504	-14.98	-112.75	2643	2211.3	1.93	34.66	27.71	143.8	128.45	36.18	2.59	3.55	1.56	0.08	2	UCSB	4.86	92.27
18	8500	-14.98	-112.75	2643	2311.7	1.87	34.67	27.71	152.2	126.79	35.54	2.56	3.57	1.38	0.01	2	UCSB	4.84	91.25
18	8624	-14.98	-112.75	2644	2346.2	1.87	34.67	27.72	152.5	127.38	35.33	2.53	3.61	1.31	0.07	3	UCSB	4.85	92.05
18	8621	-14.98	-112.75	2644	2421.6	1.85	34.67	27.72	152.6	129.82	35.27	2.54	3.68	1.30	0.11	5	UCSB	4.87	94.55
18	8619	-14.98	-112.75	2644	2469.8	1.84	34.67	27.72	151.7	131.77	35.3	2.55	3.73	1.36	0.18	2	UCSB	4.88	96.47
18	8617	-14.98	-112.75	2644	2521	1.84	34.68	27.72	151.6	132.26	35.37	2.56	3.74	1.26	0.08	2	UCSB	4.88	96.89
18	8613	-14.98	-112.75	2644	2620	1.83	34.68	27.72	153.6	131.67	35.22	2.57	3.74	1.34	0.07	3	UCSB	4.88	96.45

Table S1. Continued

Station	GEOTRACES SAMPLE Nr.	Lat	Long	Bottom Depth (m)	DEPTH (m)	Temp (°C)	Salinity	Pot. Density (kg/m ³)	Oxygen (μmol/kg)	DSi (μmol/kg)	Nitrate (μmol/kg)	Phosphate (μmol/kg)	Dsi/N (μmol/kg)	δ ³⁰ Si (‰)	2 s.d.	n	Lab	ln (Dsi)	Si*
23	9057	-14.00	-120.00	3404	50.1	24.75	36.15	24.28	212.5	1.85	1.17	0.3	1.58	3.50	0.20	1	GEOMAR	0.62	0.68
23	9052	-14.00	-120.00	3404	227.6	17.27	35.26	25.65	183.1	1.85	6.75	0.66	0.27	2.93	0.25	4	GEOMAR	0.62	-4.9
23	9051	-14.00	-120.00	3404	289.7	12.75	34.67	26.19	109.4	9.57	18.17	1.63	0.53				UCSB	2.26	-8.6
23	9050	-14.00	-120.00	3404	347.8	10.73	34.63	26.53	28.9	22.55	27.49	2.47	0.82	1.75	0.36	3/1	GEOMAR/UCSB	3.12	-4.94
23	9048	-14.00	-120.00	3404	745.8	5.51	34.50	27.22	109.6	52.23	36.51	2.51	1.43	1.43	0.30	2	UCSB	3.96	15.72
23	9047	-14.00	-120.00	3404	994.7	4.36	34.52	27.37	113.9	72.82	37.58	2.63	1.94	1.56	~	1	UCSB	4.29	35.24
23	8976	-14.00	-120.00	3403	992.7	4.33	34.52	27.37	116.3	73.6	37.39	2.61	1.97	1.52	~	1	UCSB	4.30	36.21
23	8975	-14.00	-120.00	3403	1242.9	3.62	34.55	27.47	116.2	90.39	38.02	2.69	2.38	1.50	0.18	2/2	GEOMAR/UCSB	4.50	52.37
23	8974	-14.00	-120.00	3403	1489.9	2.99	34.58	27.55	120.6	105.91	37.9	2.72	2.79	1.37	0.03	2	UCSB	4.66	68.01
23	8971	-14.00	-120.00	3403	2087	2.04	34.65	27.69	143.7	125.82	36.19	2.61	3.48	1.49	0.14	3	UCSB	4.83	89.63
23	8970	-14.00	-120.00	3403	2186.4	1.94	34.66	27.70	148.7	127.18	35.79	2.59	3.55	1.34	0.30	2	UCSB	4.85	91.39
23	8968	-14.00	-120.00	3403	2335.7	1.88	34.67	27.71	150.5	129.92	35.61	2.58	3.65	1.35	0.08	2	UCSB	4.87	94.31
23	8965	-14.00	-120.00	3403	2484.6	1.83	34.67	27.72	151.4	132.36	35.62	2.58	3.72	1.44	0.23	2	UCSB	4.89	96.74
23	9107	-14.00	-120.00	3400	2583.2	1.81	34.67	27.72	152.3	133.23	35.78	2.59	3.72	1.22	0.11	2	UCSB	4.89	97.45
23	9104	-14.00	-120.00	3400	2882	1.70	34.68	27.74	158.6	134.01	35.51	2.58	3.77	1.24	0.00	2	UCSB	4.90	98.5
23	9098	-14.00	-120.00	3400	3371.1	1.65	34.68	27.75	161.8	134.89	35.42	2.58	3.81	1.38	0.31	3	UCSB	4.90	99.47
28	9646	-11.63	-132.50	4041	20.7	27.28	36.01	23.39	201.5	1.66	2.52	0.36	0.66	3.42	0.11	3	GEOMAR	0.51	-0.86
28	9644	-11.63	-132.50	4041	59	27.23	36.01	23.41	201.9	1.66	2.46	0.37	0.67	3.25	0.11	2	GEOMAR	0.51	-0.8
28	9640	-11.63	-132.50	4041	218.6	18.01	35.41	25.58	166.7	2.34	8.19	0.8	0.29	2.45	0.20	2	GEOMAR	0.85	-5.85
28	9639	-11.63	-132.50	4041	267.6	14.04	34.91	26.11	96.7	9.27	18.01	1.61	0.51	1.72	0.07	3	GEOMAR/UCSB	2.23	-8.74
28	9638	-11.63	-132.50	4041	338.1	10.56	34.70	26.62	38.7	24.21	30.33	2.37	0.80	1.67	0.18	2	GEOMAR	3.19	-6.12
28	9636	-11.63	-132.50	4041	608	6.95	34.57	27.09	54.9	45.29	39.75	2.71	1.14	1.53	0.15	2	UCSB	3.81	5.54
28	9635	-11.63	-132.50	4041	857.2	5.29	34.53	27.27	65.9	64.62	41.75	2.89	1.55	1.55	~	1	UCSB	4.17	22.87
28	9583	-11.63	-132.50	4027	852.7	5.29	34.52	27.26	66.7	63.55	41.4	2.88	1.54	1.47	0.03	2	UCSB	4.15	22.15
28	9582	-11.63	-132.50	4027	1190.3	3.69	34.56	27.47	103.1	94.1	38.87	2.78	2.42	1.45	0.13	2/1	GEOMAR/UCSB	4.54	55.23
28	9580	-11.63	-132.50	4027	1738.2	2.52	34.62	27.62	126.9	118.7	37.34	2.69	3.18	1.45	0.41	3	UCSB	4.78	81.36
28	9578	-11.63	-132.50	4027	2087	2.04	34.65	27.69	138.7	129.82	36.5	2.64	3.56	1.32	0.37	2	UCSB	4.87	93.32
28	9576	-11.63	-132.50	4027	2284.3	1.91	34.66	27.71	143.1	133.33	36.13	2.62	3.69	1.39	0.07	2	UCSB	4.89	97.2
28	9574	-11.63	-132.50	4027	2435.2	1.85	34.67	27.72	145	135.19	35.91	2.6	3.76	1.31	~	1	UCSB	4.91	99.28
28	9657	-11.63	-132.50	4038	2981	1.68	34.68	27.74	156.3	137.53	35.59	2.56	3.86	1.29	0.05	2	UCSB	4.92	101.94
28	9656	-11.63	-132.50	4038	3229	1.60	34.69	27.75	161.4	137.33	35.24	2.54	3.90	1.32	0.08	3	UCSB	4.92	102.09
28	9655	-11.63	-132.50	4038	3478.2	1.57	34.69	27.76	164.2	137.04	35.08	2.52	3.91	1.42	~	1	UCSB	4.92	101.96
28	9653	-11.63	-132.50	4038	3875	1.56	34.69	27.76	166.9	137.14	34.92	2.51	3.93	1.38	~	1	UCSB	4.92	102.22
28	9652	-11.63	-132.50	4038	3989.3	1.56	34.69	27.76	167.7	136.94	35.03	2.51	3.91	1.33	0.15	4	UCSB	4.92	101.91
32	10022	-11.03	-142.95	4956	30	28.26	35.69	22.83	198.6	1.66	2.33	0.35	0.71	3.32	0.08	2	GEOMAR	0.51	-0.67
32	10020	-11.03	-142.95	4956	90.9	27.75	35.69	23.00	193.5	1.95	2.6	0.43	0.75	3.28	0.26	3	GEOMAR	0.67	-0.65
32	10019	-11.03	-142.95	4956	124.7	26.76	35.95	23.52	169.6	2.24	3.48	0.53	0.64	2.77	0.07	2	GEOMAR	0.81	-1.24
32	10018	-11.03	-142.95	4956	199.3	20.41	35.82	25.29	162.3	2.15	7.01	0.7	0.31	2.71	0.24	3	GEOMAR	0.77	-4.86
32	10017	-11.03	-142.95	4956	334.7	10.68	34.66	26.57	58.4	20.3	27.56	2.21	0.74	1.48	0.16	3	GEOMAR/UCSB	3.01	-7.26
32	10016	-11.03	-142.95	4956	449.1	8.66	34.64	26.89	103.2	28.31	30.33	2.09	0.93	1.40	0.06	2	GEOMAR/UCSB	3.34	-2.02
32	10014	-11.03	-142.95	4956	847.2	5.25	34.53	27.27	78.4	64.53	40.2	2.78	1.61	1.26	~	1	UCSB	4.17	24.33
32	10013	-11.03	-142.95	4956	996.2	4.52	34.53	27.36	95.8	76.14	39.16	2.73	1.94	1.34	0.24	2	UCSB	4.33	36.98
32	10012	-11.03	-142.95	4956	1243.8	3.63	34.56	27.47	114	93.81	37.96	2.68	2.47	1.41	0.03	2/2	GEOMAR/UCSB	4.54	55.85
32	10011	-11.03	-142.95	4956	1492.4	3.01	34.59	27.56	120.4	108.55	37.69	2.68	2.88	1.36	0.10	2	UCSB	4.69	70.86
32	9961	-11.03	-142.95	4954	1739	2.51	34.62	27.62	129.4	120.06	37.08	2.66	3.24	1.34	0.22	4	UCSB	4.79	82.98
32	9959	-11.03	-142.95	4954	2087	2.07	34.65	27.69	137.6	130.7	36.5	2.62	3.58	1.32	0.18	2	UCSB	4.87	94.2
32	9956	-11.03	-142.95	4954	2385.5	1.89	34.67	27.71	142	137.14	36.26	2.6	3.78	1.26	0.23	4	UCSB	4.92	100.88
32	9953	-11.03	-142.95	4954	2585.2	1.81	34.67	27.72	145.3	138.7	36.04	2.59	3.85	1.37	0.16	5	UCSB	4.93	102.66
32	10077	-11.03	-142.95	4954	2782.3	1.76	34.68	27.73	148.5	139.97	35.89	2.59	3.90	1.26	0.15	5	UCSB	4.94	104.08
32	10073	-11.03	-142.95	4954	3477.8	1.55	34.69	27.76	164	138.6	34.95	2.51	3.97	1.32	0.22	4	UCSB	4.93	103.65
32	10071	-11.03	-142.95	4954	3976	1.42	34.70	27.77	177.4	133.72	33.98	2.44	3.94	1.32	0.01	2	UCSB	4.90	99.74
32	10070	-11.03	-142.95	4954	4471	1.38	34.70	27.78	184.1	131.47	33.5	2.4	3.92	1.39	0.03	3	UCSB	4.88	97.97
32	10069	-11.03	-142.95	4954	4719.9	1.39	34.70	27.78	184.3	131.18	33.48	2.4	3.92	1.47	0.07	2	UCSB	4.88	97.7
32	10067	-11.03	-142.95	4954	4901.8	1.41	34.70	27.78	185.5	132.16	33.47	2.4	3.95	1.37	0.08	3	UCSB	4.88	98.69

Table S1. Continued

Station	GEOTRACES SAMPLE Nr.	Lat	Long	Bottom Depth (m)	DEPTH (m)	Temp (°C)	Salinity	Pot. Density (kg/m3)	Oxygen (μmol/kg)	DSi (μmol/kg)	Nitrate (umol/kg)	Phosphate (umol/kg)	Dsi/N (umol/kg)	δ ³⁰ Si (‰)	2 s.d.	n	Lab	In (Dsi)	Si*
36	10302	-10.50	-152.00	5136	128.6	25.34	36.20	24.15	178.6	1.66	1.27	0.37	1.31	2.61	0.04	2	GEOMAR	0.51	0.39
36	10300	-10.50	-152.00	5136	298.7	14.34	34.99	26.11	104.2	9.27	17.6	1.49	0.53	1.80	0.06	2	GEOMAR/UCSB	2.23	-8.33
36	10299	-10.50	-152.00	5136	348.5	10.75	34.71	26.59	75.7	20.11	26.98	2.07	0.75	1.63	0.16	2/1	GEOMAR/UCSB	3.00	-6.87
36	10297	-10.50	-152.00	5136	596.7	6.79	34.55	27.09	95.7	42.76	35.44	2.45	1.21	1.55	0.23	2/1	GEOMAR/UCSB	3.76	7.32
36	10295	-10.50	-152.00	5136	995.5	4.47	34.52	27.36	112	74.97	37.61	2.66	1.99	1.41	~	1	UCSB	4.32	37.36
36	10286	-10.50	-152.00	5141	993.8	4.63	34.52	27.34	108.4	71.94	37.71	2.64	1.91	1.45	~	1	UCSB	4.28	34.23
36	10285	-10.50	-152.00	5141	1243	3.71	34.55	27.46	115	92.15	37.7	2.67	2.44	1.48	0.17	2/3	GEOMAR/UCSB	4.52	54.45
36	10281	-10.50	-152.00	5141	2087.7	2.06	34.65	27.68	141.6	129.33	36.35	2.6	3.56	1.37	0.11	2	UCSB	4.86	92.98
36	10277	-10.50	-152.00	5141	2485.9	1.83	34.67	27.72	148.4	135.09	36.01	2.57	3.75	1.30	0.12	2	UCSB	4.91	99.08
36	10453	-10.50	-152.00	5147	2783.6	1.76	34.67	27.73	148.4	136.55	35.71	2.56	3.82	1.26	0.19	3	UCSB	4.92	100.84
36	10450	-10.50	-152.00	5147	3229.7	1.63	34.68	27.74	158.3	136.94	35.18	2.51	3.89	1.28	0.26	3	UCSB	4.92	101.76
36	10449	-10.50	-152.00	5147	3478.8	1.55	34.69	27.75	165.5	135.28	34.66	2.48	3.90	1.34	0.19	3	UCSB	4.91	100.62
36	10448	-10.50	-152.00	5147	3974.9	1.41	34.69	27.77	176.8	132.45	33.9	2.42	3.91	1.32	0.19	2	UCSB	4.89	98.55
36	10447	-10.50	-152.00	5147	4474.3	1.33	34.70	27.78	188.1	128.45	33.09	2.36	3.88	1.40	0.12	3	UCSB	4.86	95.36
36	10446	-10.50	-152.00	5147	4718.7	1.31	34.70	27.79	192.5	126.2	32.73	2.33	3.86	1.27	0.08	3	UCSB	4.84	93.47
36	10445	-10.50	-152.00	5147	4970.2	1.31	34.71	27.79	194.5	125.81	32.46	2.31	3.88	1.42	0.19	4	UCSB	4.83	93.35
36	10444	-10.50	-152.00	5147	5069.3	1.32	34.71	27.79	195	124.93	32.43	2.31	3.85	1.25	~	1	UCSB	4.83	92.5
36	10443	-10.50	-152.00	5147	5094.5	1.32	34.71	27.79	195.2	124.93	32.5	2.31	3.84	1.35	0.05	4	UCSB	4.83	92.43

Tab. S2. Mean $\delta^{30}\text{Si}$ values for samples from both laboratories. The external reproducibility (2 s.d.) of n analytical replicates and the % difference between both laboratories are overall in very good agreement.

$\delta^{30}\text{Si}$ GEOMAR	2 s.d. GEOMAR	n	$\delta^{30}\text{Si}$ UCSB	2 s.d. UCSB	n	OFFSET GEOMAR- UCSB	% diff (GEOMAR- UCSB)/GEO MAR*100
1.50	0.00	2	1.53	~	1	-0.03	-2.33
1.60	0.08	3	1.47	0.21	3	0.13	8.04
1.40	0.04	2	1.33	0.28	2	0.07	4.99
1.59	0.10	2	1.47	0.08	2	0.12	7.68
1.73	0.24	2	1.77	0.46	4	-0.04	-2.33
1.38	0.19	2	1.46	0.30	5	-0.08	-6.04
1.42	0.05	2	1.52	0.18	3	-0.10	-7.37
1.45	0.24	1	1.63	0.11	3	-0.17	-11.82
1.47	0.24	2	1.46	0.12	3	0.00	0.24
1.49	0.22	1	1.52	~	1	-0.03	-2.06
1.55	0.18	1	1.69	0.27	2	-0.14	-9.30
1.43	0.12	2	1.42	~	1	0.01	0.90
1.57	0.17	3	1.59	~	1	-0.01	-0.93
1.40	0.20	2	1.39	0.12	2	0.01	0.52
1.72	0.25	3	1.45	~	1	0.27	15.85
1.49	0.20	2	1.41	~	1	0.08	5.29
1.56	0.15	1	1.72	0.28	4	-0.17	-10.60
1.35	0.15	2	1.42	0.11	3	-0.07	-4.82
1.83	0.21	3	1.51	~	1	0.32	17.32
1.43	0.11	2	1.57	0.06	2	-0.14	-9.74
1.48	0.09	2	1.39	~	1	0.09	6.30
1.42	0.05	2	1.40	0.25	2	0.02	1.53
1.59	0.03	2	1.72	~	1	-0.13	-8.44
1.50	0.24	2	1.64	~	1	-0.14	-9.01
1.46	0.12	2	1.50	0.22	3	-0.04	-2.40

Tab. S3. Mean $\delta^{30}\text{Si}$ values for reference materials measured in both laboratories along with the literature values according to Reynolds et al. (2007) and Grasse et al. (2017). The inter-calibrated seawater standards ALOHA₃₀₀ and ALOHA₁₀₀₀ as well as the solid standards (Diatomite, Big Batch) measured at both laboratories are in very good agreement shown by the % difference between both laboratories (<2%), except for the ALOHA₃₀₀ with a difference of 25%.

		GEOMAR						UCSB							
	Reference Mean	$\delta^{30}\text{Si}$ Mean	2 s.d.	$\delta^{29}\text{Si}$ Mean	2 s.d.	$\delta^{30}\text{Si}$ Median	n	$\delta^{30}\text{Si}$ Mean	2 s.d.	$\delta^{29}\text{Si}$ Mean	2 s.d.	$\delta^{30}\text{Si}$ Median	n	OFFSET UCSB-Kiel	% Difference (UCSB- Kiel)/USCB
ALOHA1000	1.24	1.27	0.15	0.68	0.13	1.27	35	1.29	0.22	0.66	0.11	1.29	35	0.02	1.32
ALOHA300	1.68	1.80	0.22	0.91	0.19	1.76	10	1.44	0.28	0.73	0.14	1.40	12	-0.36	-25.22
Diatomite	1.26	1.25	0.14	0.61	0.12	1.26	9	1.26	0.20	0.64	0.10	1.26	25	0.01	0.86
BB	-10.48	-10.56	0.26	-5.44	0.14	-10.56	12	-10.50	0.21	-5.36	0.11	-10.50	120	0.06	-0.57